Demonstration Program
Urban Flooding and Channel Restoration
in Arid and Semi-Arid Regions (UFDP)

Program Overview and Direction

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Program Overview

- Congressional add ($2M) in FY03 by Sen. Reid (NV). FY04 funding of $1M ($650k after S&S)
- Collaboration between Corps and Desert Research Institute
- Urban flood and channel restoration demonstration program
- Envisioned as 5-year program with $2-3 million funding per year
- Regional program adapted for arid and semi-arid regions
- Products must be useful to the field
- Teaming of ERDC, HEC, DRI, SPD, and local interests (SNWA, CCRFCD, Reno, NVDEP, et al)

Needs of Arid and Semi-Arid Regions

- Rapidly developing population centers
- Unique watershed management issues
- Opportunity to meet the special needs of this region
- Expertise of Desert Research Institute
- National mission and expertise of Corps
- Expertise and interest of local stakeholders
- International potential for arid regions expertise
- Broad applications for urban channel restoration
- High potential ROI benefits

Channel Restoration

- Low-Flow Design
- In-stream Features
- Losses at Bends
- Vegetation Impacts
- Stabilization Measures
- Riparian Restoration
- Stability Analyses
- Habitat Assessment
- Floodplain Restoration
- Water Quality
- Sediment Transport
- Impacts/Benefits Analysis

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Urban Flood Damage Reduction

- Supercritical Flood Channels
- Stabilization Measures
- Multi-dimensional Sediment Transport Modeling
- Hydrologic Prediction
- Stability Analyses
- Evaluation of Impacts
- Vegetative Resistance
- Vegetation Stability

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Demonstration Program

- Take new or nearly completed R&D technologies and demonstrate them in the field
- Take technologies developed for perennial streams and demonstrate them in arid regions
- TOWNS program is closest in focus (urban flood damage reduction and channel restoration) but technologies can (will) come from various areas
- Match up the highest ranked needs with the most effective technologies
- Field needs are the driving factor
- Priorities identified by SPD and local interests

FY03 funded demo projects - Corps

6. Sediment transport processes in arid regions
7. Analytical tools for stream restoration design – Truckee River
8. Design guidance for grade control and streambank stabilization in arid regions
9. Design guidance update for supercritical flow channels
10. Characterization of resistance for southwestern vegetative complexes
11. Collaboration on five DRI-led work units

FY03 funded demo projects - DRI

1. Truckee River, McCarran Ranch – innovative river restoration assessment technologies
2. QPF – use of high-resolution data to improve estimates
3. Spatial variations in alluvial fan materials and runoff characteristics
4. Improved infiltration estimates for alluvial fan materials
5. Supercritical flow guidance – collaboration
6. Sediment transport in arid regions
7. Application of 2D sediment transport model to Las Vegas Wash
8. Impact of grade controls on nutrient reduction

FY04 funded work units

2. Truckee River restoration: collaborative effort using habitat mapping and basin modeling (DRI), hydrodynamic (ERDC), and EFM (HEC)
3. Supercritical flood channel design guidance
4. Streambank stabilization and grade control, improved design criteria for arid regions
5. 2D sediment transport modeling of Las Vegas Wash – evaluation of channel modifications on downstream flows and sediment transport
6. Evaluation of sediment transport functions for Las Vegas Wash
7. Infiltration – hydraulic characteristics of different alluvial fan materials

Truckee River restoration
McCarran Ranch

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Supercritical flood channels: improved design guidance

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Grade control in Las Vegas Wash

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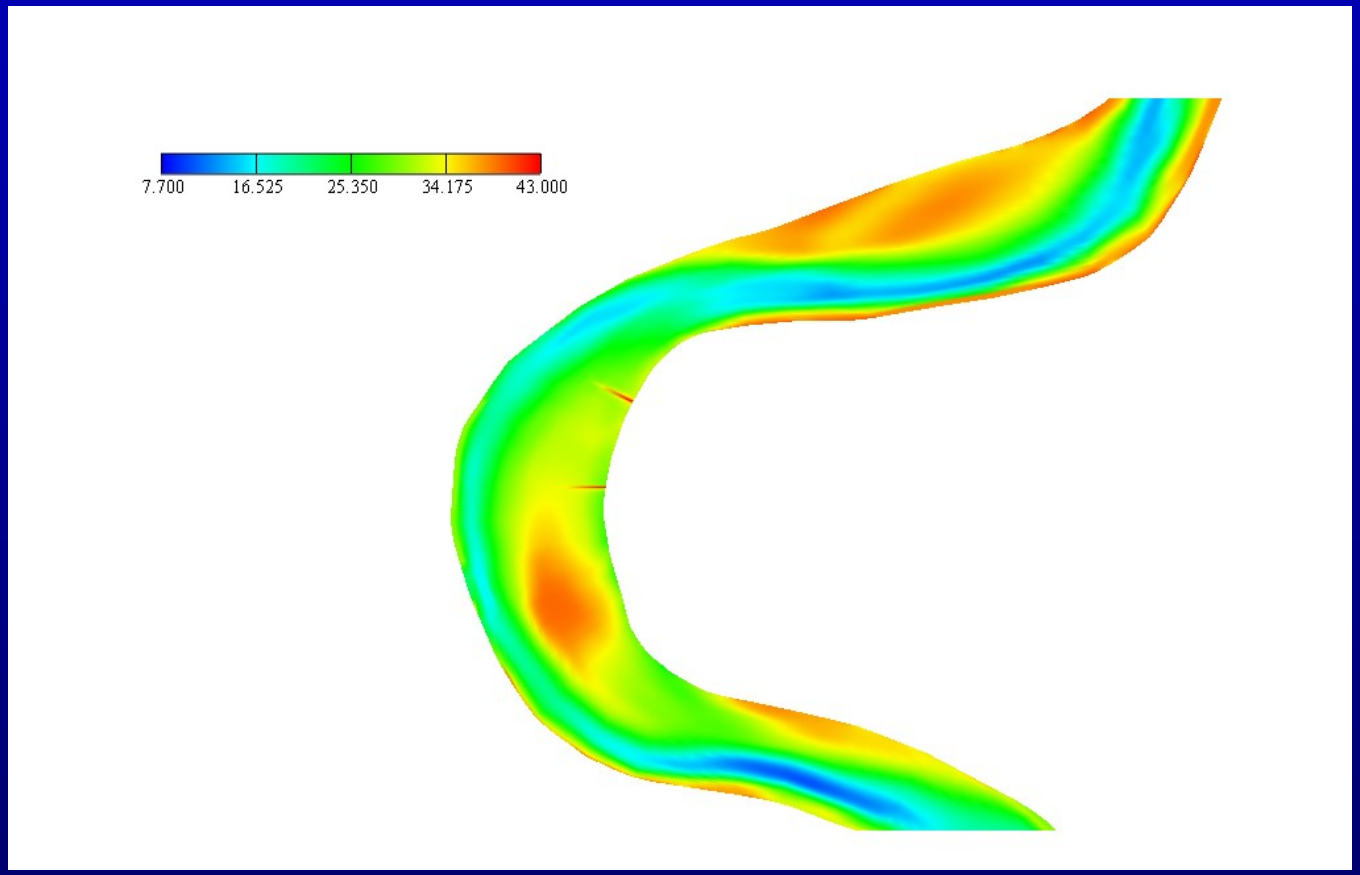
Streambank stabilization in Las Vegas Wash (note vegetation)

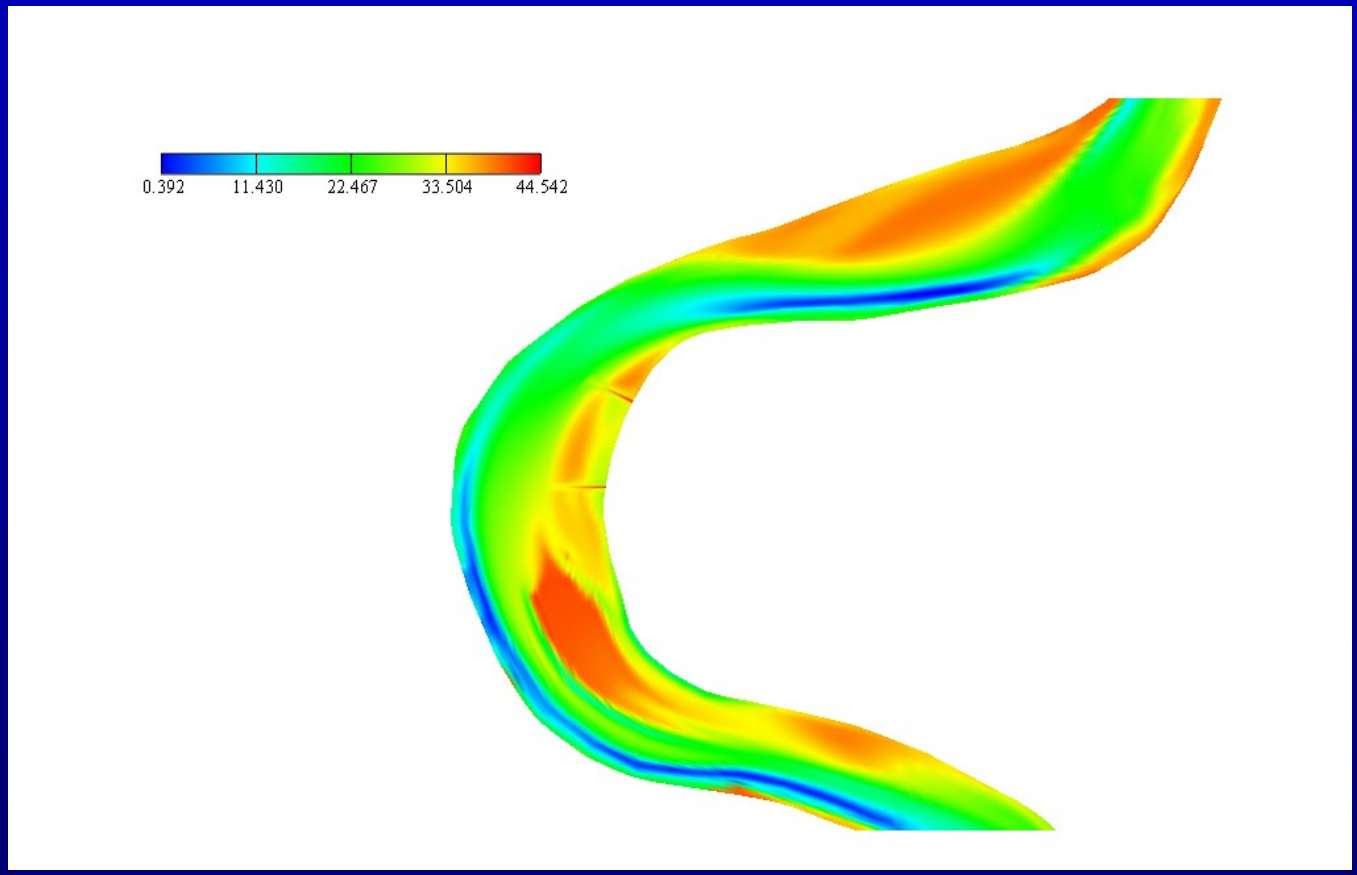
2D Sediment Transport Modeling
Example of Long Term Simulation

Initial Dike Field Bathymetry
(flow is from top to bottom of slide)



2D Sediment Transport Modeling
Example of Long Term Simulation

Final Dike Field Bathymetry – 3 Year Simulation
(flow is from top to bottom of slide)



Wish list: High priority unfunded work units

1. Vegetative resistance: seasonal variation of resistance, and susceptibility of vegetation to scour and failure at high flows
2. Estimation of volume-duration-frequency curves for annual or seasonal maximum flows in arid and semi-arid watersheds
3. Multi-dimensional sediment transport modeling with visualization of impacts for resource mgrs.
4. Integrated decision support system for urban levee systems
5. Proposals in other states (New Mexico, Arizona, and California)

What's next

- Technical transfer of FY03 products (website and other methods)
- Field and local involvement with ongoing work
- Leverage, collaborate, and cooperate to make our limited funds go further
- Continued feedback from districts and local stakeholders (information exchange, identification of issues and priorities, suggestions for future work)
- Goal: consensus on regional needs and priorities, and delivery of products that meet those needs
- Investigate potential for a continuing regional program

Further discussion… any questions?

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